

UNITED STATES PATENT APPLICATION

FOR

SYSTEMS AND METHODS FOR DISTRIBUTION OF ENTERTAINMENT AND  
ADVERTISING CONTENT

BY

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### Cross Reference to Related Applications

[001] This application is a Continuation-In-Part of U.S. Patent Application Serial No. 09/781, 679, for "Video Distribution System," filed February 12, 2001 (Reference WT-15), and of U.S. Patent Application Serial No. 09/781,680, "Video Distribution System," February 12, 2001 filed (Reference WT-16), and both of which are assigned to the assignee of the present application. The disclosures of the aforementioned U.S. Patent applications are hereby expressly incorporated herein by reference.

[002] This application claims priority to U.S. Provisional Application, Serial No. 60/326,563, for "System and method for Ultrahigh Reliability, High Density, Short Wavelength Laser Read and Write Data Storage System With Content Protection," filed September 28, 2001, the contents of which are expressly incorporated herein by reference.

[003] This Application further claims priority to U.S. Provisional Application, Serial No. TBA for "System and Method for Optically Altered DVD (DVDO™)," filed November 7, 2001 (Reference number WT-25), the contents of which are expressly incorporated herein by reference.

[004] This Application further claims priority to U.S. Provisional Application, Serial No. 60/322,186, for "Ultrahigh Reliability, High Density Read and Write Data Storage System," filed September 14, 2001 (Reference number WT19-Prov), the contents of which are expressly incorporated herein by reference.

[005] This Application further claims priority to U.S. Provisional Application, Serial No. 60/325,888, for "System and method for Ultrahigh Reliability, High

Density, Short Wavelength Laser Read and Write Data Storage System With Content Protection," filed September 28, 2001, (Reference number WT-22), the contents of which are expressly incorporated herein by reference.

[006] This application further claims priority to U.S. Provisional Application, Serial No. 60/326,563, for "System and Method for Ultrahigh Reliability, High Density, Short Wavelength Laser Read and Write Data Storage System With Content Protection," filed September 28, 2001 (Reference number WT-21), the contents of which are expressly incorporated herein by reference.

## **DESCRIPTION**

### **Field**

[007] This invention relates to apparatus and methods for distributing entertainment content and advertising content and, more particularly to for distributing entertainment content and advertising content tailored to a consumer.

### **Background**

[008] The current size and success of the entertainment industry shows the enormous market for audio and video entertainment by consumers. The music recording industry, television and movie industries, and professional athletics, among others, have all seen large economic gains since the dawn of television and radio. In fact, the demand for such broadcast audio and visual content spawned new fora for advertising. However, current methodologies for the distribution and viewing of audio/visual content including music, movies, information, and advertising have become outdated due to substantial steps forward in technology.

[009] Traditionally, consumers, i.e., those watching or listening to the audio/visual content, were forced to view or listen to the content as it was broadcast. Television stations followed specific schedules to let consumers know when their show, movies, information or sporting events would be broadcast. In addition, radio stations broadcast the music or shows according to their set schedules. As a result, the consumer had very little flexibility in deciding when to view their show, or listen to their music. Similarly advertisers were restricted by the schedule to broadcast their advertisements at whatever affordable, available time was most likely to include viewers interested in their products. The system was neither efficient for the advertisers nor convenient for the consumers.

[010] As a result, techniques developed to allow the consumer to record the music or movie from the broadcast for later viewing or listening. Audio cassettes allowed for the capture of audio content. VCR's allowed the consumer to capture audio visual content. Movie rentals allowed users to rent movies for viewing at a convenient time and place. In addition, models such as those employed by TiVo and Replay allowed for the capture of such content for later viewing. However, these models required the viewer to know in advance the scheduled broadcast time for their show and to program a device, such as a VCR to record their shows. This required additional cost for the recording device and medium, and time to study the broadcast schedule and to program the recording device accordingly. This scheme, however, adversely impacted advertisers, as consumers watching the recorded content often fast forwarded past any advertisements.

[011] More recently, video on demand (or audio on demand) has allowed consumers the ability to modify the schedule of the audio/visual content by simply demanding content at times convenient to the consumer. This technique suffered from two profound limitations. First, the content distributed in this scheme was easily copied and disseminated without the consent of the content providers. In addition, advertisers were further limited in their options, as they now may not even chose the broadcast time for their commercials. Instead, they were limited to transmission of the advertisements at the time demanded by the consumer.

[012] Another limitation of current content distribution schemes is that Digital Rights Management (DRM) schemes are digitally implemented. As technology advances, the processing power available for decryption, collaborative distributed processing efforts such as those utilized to break DES (digital encryption system), have minimized the security of existing DRM models. In addition, the publication of software applications such as DeCSS for cracking DVD, and the availability of unencrypted formats, render the cryptographic analysis of digital keys possible. As a result, estimates place lost revenues due to copied VHS recordings at roughly 30%. Furthermore, in emerging markets such as China, the estimates soar to nearly 80%. Estimates of the loss due to ripped CD's and DVD's are difficult to estimate presently.

[013] It is desirable, therefore to provide a distribution scheme for delivery of audio and video content with increased security and convenience, and higher density (i.e. greater data per disc). In addition, the method should provide the ability to archive audio and video content on secure discs for consumers to view at their

convenience. In addition, the method should provide the ability to better target ads to the wants and needs of the consumers who will be watching them.

### **SUMMARY**

[014] Consistent with the principles of the present invention, a device for generating audiovisual display signals, includes a first input terminal receiving content signals representative of an audiovisual event, the signals including insertion points indicating the integration of an advertisement, a second input terminal receiving ad signals representative of an advertisement, a first buffer storing the ad signals, and a processor converting the content signals into display signals of the event and converting ad signals stored in the first buffer into display signals of an advertisement upon detection of an insertion point.

[015] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[016] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments and together with the description, serve to explain the principles of the invention.

[017] Figure 1 is a block diagram showing a distribution model for distributing audiovisual content and advertising content to consumers;

[018] Figure 2 shows a flowchart depicting the stages for inserting advertisements into viewed content.

[019] Figure 3 is a block diagram of an optical reader.

[020] Figure 4 is a block diagram showing a side view of a disc; and

[021] Figure 5 is a diagram depicting a top-view of a disc.

### **DETAILED DESCRIPTION**

[022] Reference will now be made in detail to exemplary embodiments, which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will, throughout the drawings, refer to the same or like parts.

[023] A system and method provide for unrestricted distribution of content-protected discs, in a manner optimized to meet market conditions. This would include, but not be limited to, direct-to-consumer shipments, club models, and/or distribution via traditional retail outlets, or any other means of delivering physical content to a consumer. Furthermore, consistent with the present invention, advertisements may be inserted at strategic locations in the content such that advertisements may be targeted to customers based on consumer preferences.

[024] As shown in Figure 1, the system 100 comprises a content provider 102, a plurality of consumer locations 104, a distribution system operator 106, one or more distribution agents 108, and one or more advertisers 110. Customer locations would watch the distributed content on a device such as a set top box 114. System 100 additionally may contain numerous communications links between the various components of the system, as will be described.

[025] Content provider 102 provides content (i.e. informational content such as shopping catalogs, video content such as movies or TV shows, or audio content such as songs or radio shows), via discs or other method to distribution agents. In turn, distribution agents 108, such as retailers, provide the discs to customers.

Customers 104 may purchase the discs from distribution agents 108, or maintain a subscription for the continual update of discs. Customers then remit payment for the discs to distribution agents 108, who return a predetermined portion of the receipts to content provider 102. In addition, content providers 102 may distribute content directly to customers 104, in which case customer 104 would remit payment for the disc directly to content provider 102.

[026] Furthermore, the content providers may widely distribute the content free of charge, in a protected format, such that the distribution system operator may control access to the content and charge for any presentation of the content, either on a pay-per-view basis, a one time fee, subscription or other basis. Preferably, the content is hardware protected, software encrypted, or both, to prevent unauthorized access to the content. The content may be hardware protected by distribution on proprietary discs which are not readable by commercially available hardware. Reading the disc then requires a proprietary set top box 114. In order to break receive enabling commands or keys necessary to unlock any encrypted content, a consumer would remit payment to the system operator.

[027] Customer 104, then plays the distributed content. As the content is played, the box may also receive advertisements, either directly from system operator 106, or directly from advertisers 110. In addition, the advertisements may have been previously transmitted to the set top box and stored in a buffer. The advertisements may be inserted into the viewed content during viewing as is described below. The set top box may send information to the distribution agent,



such as identification of the content viewed, and the identity of the distribution agent from whom the consumer received the content.

[028] System operator then sends data regarding the viewings of advertisements, such as the number of viewings, and residential preference information to the advertiser. Such information allows advertiser 110 to modify its advertising approach (i.e. direct advertising campaigns to new preferences). Finally, advertiser 110 submits payment to the system operator.

[029] System operator 106 may submit viewing data, and payment royalties or rental receipts to the content providers.

[030] The content provider may also distribute audio/visual content for pre storage on the consumers set top box, so that it may be viewed or listened to at any time for a fee. Similarly, the content provider may transmit broadcasts of live events. Both forms of distribution may contain security to prevent consumers from circumventing payment for the content.

[031] The content providers first distribute audio/visual content, including but not limited to information, music, television shows, and movies, to the consumer locations for storage. This content may be viewed at any convenient time by retrieval from its storage location by the consumer. The content providers may broadcast the content to the set top boxes for storage or, preferably, distribute the content via a secure storage medium. Traditional CDs and DVDs may be used; however, the storage capacity of traditional discs would result in the distribution of great quantities of such discs. In addition, it has become increasingly easy to pirate the content of such discs by ripping the contents from the disc, and decoding it using

applications available over the Internet. Instead, optically altered DVDO's™ are preferably used to securely distribute the content.

[032] Just as consumers will be able to play their shows at their convenience, advertisers will be able to tailor their broadcasting schedules to maximize the efficiency of advertising campaigns. The distributed content preferably contains insertion points in the data at strategic locations to provide space for advertisements. Similarly, the streaming live content may contain insertion points allowing advertisements to be placed at strategic locations. The advertisements are supplied via known methods (e.g. over the air, by direct broadcast satellite, internet, cable, or POTS) to set top boxes at the consumer locations (i.e., households) and pre-cached, such as in semiconductor memory or on a hard drive. Therefore, once a consumer selects a show for playing from either a live feed or pre-storage, the set top box will play the show, occasionally encountering insertion points in the encoded content. As it encounters these insertion points, it will place a pre-cached advertisement in the content for presentation to the consumer.

[033] The system therefore provides a method for displaying advertisements at a user location. The method includes generating a customer preference containing user characteristics, displaying entertainment content at the user location, the entertainment content including insertion points for display of advertisements, transmitting a plurality of advertisements to the user location, selecting a subset of the transmitted advertisements based upon the customer preference, and displaying at least one of the selected advertisements during at least one of the insertion points.

[034] Figure 2 shows an exemplary method for integrating advertisements at insertion points in the viewed content. As the set top box of the consumer is receiving data for presentation to the viewer (either live feed, disc, or other source), it will occasionally encounter insertion points. An insertion point may be a set of bytes in the content representative of a command to insert an advertisement in the presented content. In one embodiment, the command may comprise a pointer to another storage location (i.e., to memory storage, a live feed, or to another disc or location on the disc).

[035] Once the set top box encounters such a command (stage 202), it then determines whether an advertisement is appropriate (stage 204). An advertisement may be appropriate if the insertion point would be a logical place to insert an advertisement for the current residential preference at that customer household. In addition, an advertisement may be inappropriate if it would not make sense to advertise at that point in the content. An advertisement may not be appropriate if the customer has paid the higher rate for the ability to view the content free of advertisements. The residential preference of the customer may reside in the memory of the set top box, or, in one embodiment, may reside on a host computer of the content provider or video distribution system operator. If the set top box determines that an advertisement is not appropriate, it simply resumes playing the content (stage 206).

[036] If, however, the insertion point is appropriate for a commercial, then the set top box must determine if an advertisement is available for insertion (stage 208). The advertisement may be stored on a hard drive, received via live feed, or

received on a disc. In addition, the command to insert an advertisement may specify a location from which to retrieve the advertisement, or may allow the set top box to choose the advertisement based on a predefined algorithm, or based on residential preferences. If an advertisement is not available, the set top box may return to stage 206 to resume playing the content. In addition, the disc containing the content may contain a default advertisement or advertisements (such as to be chosen based on a customer preference), in addition to the insertion command, which may be played if no appropriate advertisement is available.

[037] The set top box then plays the advertisement (stage 210). In addition, the advertisement may be an interactive advertisement (stage 212), in which case the advertisement will allow the user to interact via any known or later developed means (stage 214). In addition, a user may enter commands by inputting commands through a remote control, or communicating via the internet to the advertiser (stage 216).

[038] As an additional level of security, the audio data at the insertion points may be omitted from the discs,. The omitted portions of the audio track will be downloaded prior to viewing and seamlessly integrated into the audio, if the consumer properly remits payment and receives the proper key. Otherwise, the content will be incomplete, even if the encryption is cracked.

[039] Once the set top box has completed presentation of the advertisement, and any interaction, the advertisement may contain a return command, commanding the set top box to resume presentation of the content. Such a command allows advertisements to be any length, providing greater flexibility to advertisers.

[040] This distribution model allows advertisers the flexibility to tailor advertisements more efficiently to specific target audiences. For example, a set top box may be programmed to maintain residential preference information for a household, and to present advertisements that are targeted to the preferences of that residence. In particular, the box may contain a circuit device, which generates a customer preference containing characteristics of a device user. The box can be programmed to select advertisements for presentation on such criteria as the content currently being viewed(sports, or children's show), historical preferences of content, time of day, location of the box, including zip code or telephone area code, weather, time of year, or demographics of the region. In certain applications, the customer may be permitted to totally avoid the advertisements by paying an increased fee. In the alternative, a consumer could receive content for a reduced or no fee if they are willing to view additional advertisements.

[041] Consistent with the present invention, the distributed content may be encrypted, either by hardware or software (or both). Encrypting the content, such that it may not be accessible to the customer, will allow system operator 106, to control access to the content. For example, hardware encryption, such as can be achieved by optically altering the discs (discussed below), will prevent the discs from being readable by technology currently accessible to consumers. In addition, software encryption will provide further control on access to the content, such that if hardware encryption is somehow broken, viewing the content will still require the user to break the software controls. Such software encryption can use any no

known or later developed method. Preferably, such a scheme would utilize time sensitive keys that will “expire” after a predetermined amount of time.

[042] An example of a key scheme that may be used is one incorporating three separate, yet dependent keys. For example, a host associated with the content provider can generate a random number (Key A) and transmit it to the consumer’s set top box. In addition, the content provider may, through the same or a different schedule, transmit an algorithm, randomly selected from a large number of algorithms (i.e., 3000), to the consumer’s set top box. Another key, Key B may reside in the box, for example, in a circuit device. A circuit device within the box will perform the transmitted algorithm on received key A and stored key B. The result will be a third key, Key C. Key C will then be transmitted back to the content provider for comparison to a key stored at the content provider. If the keys match, an enable signal will be sent to the set top box to allow the viewing of the content. In certain applications, it may also be desirable to place a security code on the disc itself. For example, the first words stored on the disc may contain a security code which is oversampled a predetermined number of times.

[043] Consistent with the invention, a user who has received content encoded with software key or keys, may request to view certain content. Upon the request, the box may transmit billing information to the central controller. The central controller may then charge the consumer’s account on a rental, purchase, subscription or other basis, and transmit back an enabling command, allowing the set top box to decode and present the requested content.

[044] This distribution scheme also maximizes benefit to the advertisers by providing greater distribution flexibility for advertisers. Ads can be streamed with content, or pre-cached for selection. In addition, by selecting the advertisements based on a customer preference, advertisers may analyze the variants to compare sell through for a product in various location. If any variant in the customer preference proves to be statistically significant in predicting which consumers will purchase the products, consumer preferences and advertisements may be easily modified to better target the audience. This can be done by a feedback loop, which provides data to the system operator or content provider regarding the consumer preferences and the times the advertisement was presented.

[045] In addition, content providers will be able to charge advertisers directly for advertising. They may charge the advertiser using numerous schemes such as by auctioning advertising time to advertisers based on customer preferences, or by charging the advertisers according to a rate card (i.e., charging a flat rate for each time the ad is presented to a consumer). In addition, demand for advertising within a particular customer preference or demographic can be used to determine advertising rates.

[046] Requiring the content provider to verify the key prior to sending an enabling command also allows the content provider to bill the consumer for the content demanded. In this way, the enabling key may only be transmitted to a consumer who is in good standing with his or her bill. The consumer may be billed on a subscription model (i.e., be billed a flat rate for a period of time), may be billed per viewing of each show, may purchase a show (for unlimited viewings), or other

desired billing scheme. In addition, when billing by the number of presentations of an advertisement, the content provider will have the flexibility to bill an advertiser at discounted rates for a large volume of presentations.

[047] The keys and billing information may be sent via any communication means such as a modem, internet connection, telephone line, cable, or other means. In addition, in one embodiment, the set top box may contain a credit card or smart card reader for the recording and transmission of payment information.

[048] In addition, the content provider may bill a customer a higher amount for a subscription to view the audio/visual content without advertisements.

[049] Apparatus consistent with the present invention, provides hardware security for the distributed content. The distributed discs may be optically altered DVD's or CD's, (DVDO™). A DVDO is an optically-altered physical medium, which is not readable by currently available consumer players. Such a disc is described in more detail in the above-referenced provisional applications. Consistent with the present invention, an Optically Altered DVD (DVDO™ or DVDOA™) provides content protection in lieu of or in addition to other DRM schemes.

[050] For example, one or more intrinsic optical changes may be made to traditional CD (780nm) and/or DVD (650/635nm) read technologies to render the reading of DVDO or optically altered CD (CDO™ or CDOA™ herein referred to as DVDO) impossible by commercially available readers. Thus for videos, music, and other content, provided via physically delivered media, a DVDO player is required.

[051] A disc is generally composed of at least two layers, a transmissive outer layer covering a reflective inner data layer. Discs are pressed in this format



during the manufacturing process. A typical disc is 1.2 millimeters thick. Currently, the outer transmissive layer on a CD is 1.2 millimeters thick. In addition, for a typical DVD, the transmissive layer is 0.6 millimeters thick, such that the reflective data layer is located in the center of the disc, approximately 0.6 millimeters from either surface. Details of conventional DVD discs are set forth in the DVD-Video Format Book Specification, Version 1.11 published in March 1999 by Toshiba Corporation on behalf of the DVD Forum.

[052] In order to read either CD's or DVD's, an optical reader directs a laser through the transmissive layer, focused on the reflective data layer. Modern technology requires the ability to focus the layer at precisely the depth of the reflective layer, in order to reduce bit error rates.

[053] Consistent with the present invention, a disc is provided in which the inner reflective data layer is closer to the surface of the disc. For example, the transmissive outer layer of the disc may be reduced in thickness from 1.2 mm (for a CD), and from 0.6 mm (for a DVD) to a lesser thickness such that conventional readers are incapable of focusing on the reflective layer. By reducing the thickness of the transmissive layer, the reflective data layer of the disc is brought closer to the optical reader. Especially if used in a reader or player with short wavelength laser diodes, this allows for additional data to be encoded on a single disk (and together with improved error correction schemes), can greatly increase the storage capacity of discs. When used in combination with a larger buffer, the duty cycle, i.e. the time at which the diode is emitting the laser, may therefore be significantly reduced, therefore increasing the usable lifetime of the diode.

[054] In order to read discs of this type, an optical reader will require a laser diode, which can focus on the reflective surface of the disc through a transmissive layer of less than 0.6 mm. To do this, the reader may include a Z-directional focus mechanism such as a drive mechanism capable of moving the disc tray closer to the laser diode or vice versa. In addition, the reader may simply place a laser diode closer to the surface of the disc than a conventional disc reader.

[055] The DVDO may contain a thin coating of material having a high transmissivity at 400-410 nm and low transmissivity at 635-650nm allowing the proprietary player to drive a 635 lasers at a higher power to penetrate, but preventing commercially available DVD players from reading the disc. Using the higher transmissivity, thinner coatings, a lower power diode may be used to extend the usable life of the diode.

[056] Instead of, or in addition to, reducing the thickness of the transmissive layer, the optical disc may instead be made thicker than conventional discs. This will also change the focal point at which the laser diode must focus to a point outside of the capabilities of conventional DVDs or CDs.

[057] Finally, discs may provide a hardware security feature by incorporating a larger diameter than a conventional CD or DVD. Such a disc must be sufficiently large that they cannot be inserted and played in a conventional CD/DVD player discs may range from about 125 mm to 300 mm.

[058] In addition, a disc may be altered to include two reflective surfaces. The first may consist of a reflective layer for encoding content in a format consistent with and readable by conventional CD or DVD reader standards. The second side

of the disc may comprise a reflective layer for encoding content in a format consistent with and readable by the proprietary optical readers consistent with a DVDO. This would allow distribution agents to distribute unencoded content for viewing by all consumers, while simultaneously distributing content which is unviewable without the proprietary reader.

[059] In addition to being able to read DVDO's™, such a system may be contain the necessary optics to read from (and/ or write to) conventional, legacy CD and DVD discs.

[060] Figure 3 shows a block diagram of components in set top box 114. Set top box 114 includes a processor 302, a storage 304, a disc reader, drive mechanism 306, an integrated circuit 308, a fast memory 310, a decompressor 312, an output 314, and a communications channel 316. In addition, the system may include a remote unit port 318 and a communication interface 320. Consistent with the present invention, integrated circuit 308, which may be implemented as an ASIC may perform one or more of the functions listed above. The processor may perform the functions of any circuit devices described.

[061] Disc reader mechanism 306 reads data from a disc, such as a DVD, CD, or optically altered CD or DVD (hereinafter a DVDOA or DVDO). In one embodiment, the disc contains the audiovisual content provided by a content provider. As the data is read by disc reader mechanism 306, integrated circuit 308 converts the optical output of disc reader 306 to a digital signal. This is then output to processor 302 and may be stored in memory, such as fast memory 310 or large

storage 304. Alternatively, the output may be sent to decompressor 312 for decompression into output signals to be sent to TV and speakers 314.

[062] In addition, communications channel 316 may be used to download live events from a content provider. Channel 316 may be a Direct Broadcast Satellite link (DBS), Cable link, or other communications connection. In addition, advertising content may be transmitted to set top box 300 via communications link 216, or a separate, yet similar communications channel (not shown). Once received, advertising information may be stored in hard drive 304. Storage 304 may be any storage medium, such as a hard drive or RAM. Storage 304 preferably is large in volume.

[063] Modem 320 may be used as a back channel connection to the content provider such as for communicating a play request to the content provider, or for receiving billing information. In addition, modem 320 may be used to communicate billing information, to receive A codes, algorithms or enabling commands for security purposes. Finally, modem 320 may be used to communicate customer preference information between the set top box 300 and a content provider.

[064] Set top box 114 includes an input circuit for receiving a permission signal. The circuit generates an enable signal, enabling a circuit device to process the data read by the optical pickup assembly into display signals. The functions of the input circuit may be incorporated into processor 302. Some or all of the functions of the circuit device may be incorporated in processor 302 or integrated circuit 308.

[065] Consistent with the present invention, an box 114 may read a DVDO using an optical pickup assembly having a Z-directional focus mechanism, which can focus the laser at different depths. Consistent with the present invention an adjustable focal length system is utilized to read both legacy DVD and CD disks along with DVDO type disks. For example, apparatus 200 may include multiple optical pickup assemblies. One such assembly may be capable of reading DVDO's, and one or more may be capable of reading legacy CDs or DVDs.

[066] Box 114 may also contain a terminal 117 for Emergency Feedback and Notification System (EFAN) compatibility. EFAN is described in U.S. Patent Application No. 09/990,450, entitled "System and Method for Emergency Notification Content Delivery," filed November 21, 2001.

[067] Finally, set top box 114 may contain an interface for downloading to a remote unit all purchased or rented content, together with any necessary keys. The remote unit may be carried with a consumer away from the home and set top box.

[068] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.